



# WebObjects and Web Services

**Session 705**





# WebObjects and Web Services

**Melissa Turner,  
Ron Lue-Sang and François Jouaux  
WebObjects Engineering**

# Introduction

## **This session**

- Introduces Web Services
- Discusses using WebObjects to vend and consume Web Services



# What Is Covered

## What you will learn

- Buzzwords: SOAP, WSDL, UDDI, Axis
- How to vend a Web service using WebObjects
  - Traditional model (you write everything)
  - Using Direct to Web Services
- How to consume a Web service using WebObjects



# What Is Not Covered

## What you will not learn

- In depth discussion of standard WebObjects technologies
- .Net



# What Are Web Services?

<b>B</b>	<b>I</b>	<b>N</b>	<b>G</b>	<b>O</b>
<b>SOAP-RPC</b>	<b>XML</b>	<b>.wsdd</b>	<b>WS-Security</b>	<b>J2EE</b>
<b>SOAP</b>	<b>WSDL</b>	<b>JAX-RPC</b>	<b>CLR</b>	<b>.Net</b>
<b>Apache SOAP</b>	<b>Crimson</b>	<b>WS- Inspection</b>	<b>WSIL</b>	<b>XML Schema</b>
<b>tModel</b>	<b>JAXM</b>	<b>WSFL</b>	<b>Xerces</b>	<b>JAXP</b>
<b>XML-RPC</b>	<b>XSL/XSLT</b>	<b>UDDI</b>	<b>Axis</b>	<b>DISCO</b>



# What Are Web Services?

- Web services are web pages for computers
- Information transmitted is XML encoded
- Accessed using SOAP, usually over HTTP
- Described using WSDL
- Located using UDDI



# Why Are Web Services?

- Move data between silos
  - Database accessed using WebObjects
  - CRM system
  - Purchasing and fulfillment systems
- Automate business processes
  - Ordering, billing
- Personalize customer interaction





# Types of Web Services

- RPC vs document style
  - SOAP-RPC, XML-RPC
  - SOAP document style
- Synchronous/asynchronous
  - Request/Response
  - Solicit/Notification



# The Technologies: SOAP

- Lightweight protocol for transmitting data in a distributed environment
- Not bound to a specific wire protocol
  - SOAP over HTTP
  - SOAP over SMTP



# The Technologies: SOAP

```
<SOAP-ENV:Envelope
  xmlns:SOAP-ENV="http://schemas.xmlsoap.org/soap/envelope/"
  SOAP-ENV:encodingStyle="http://schemas.xmlsoap.org/soap/encoding"/>
  <SOAP-ENV:Body>
    <m:GetLastTradePriceRequest
      xmlns:m="Some-URI">
      <Symbol>DEF</Symbol>
      <Company>DEF Corp</Company>
    </m:GetLastTradePriceDetailed>
  </SOAP-ENV:Body>
</SOAP-ENV:Envelope>
```



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    <m:GetLastTradePriceResponse
      xmlns:m="Some-URI">
      <PriceAndVolume>
        <LastTradePrice>
          34.5
        </LastTradePrice>
        <DayVolume>
          10000
        </DayVolume>
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# The Technologies: WSDL

- Defines interfaces for Web services
  - Location
  - Datatypes
  - Messages





# Faux Demo

WSDL

**Melissa Turner**  
**WebObjects Engineering**



# The Technologies: UDDI

- Registry for business information
  - Can have public or private registries
  - Dynamic interaction with business partners
- White, yellow, and green pages
- Service can be specified by tModel
- A UDDI server can be build as a Direct To Web Services application



# Why Web Services in WebObjects?

- We are one of the silos
- Allow users to leverage existing WO investment
- Allow users to leverage EOF technology to deploy Web services
- Leverage existing WebObjects session model



# WebObjects and Web Services

- Support for WebObjects used as server or client
- Direct to Web Services
- Built around Axis

*axis*



# Why Do You Keep Saying (EO)Access?

- Actually Axis
- Open source SOAP implementation from Apache
  - Next generation of Apache SOAP
- Has support for both client and server roles
- At heart of WebObjects implementation of Web services

*axis*



# What Happens on the Server Side?

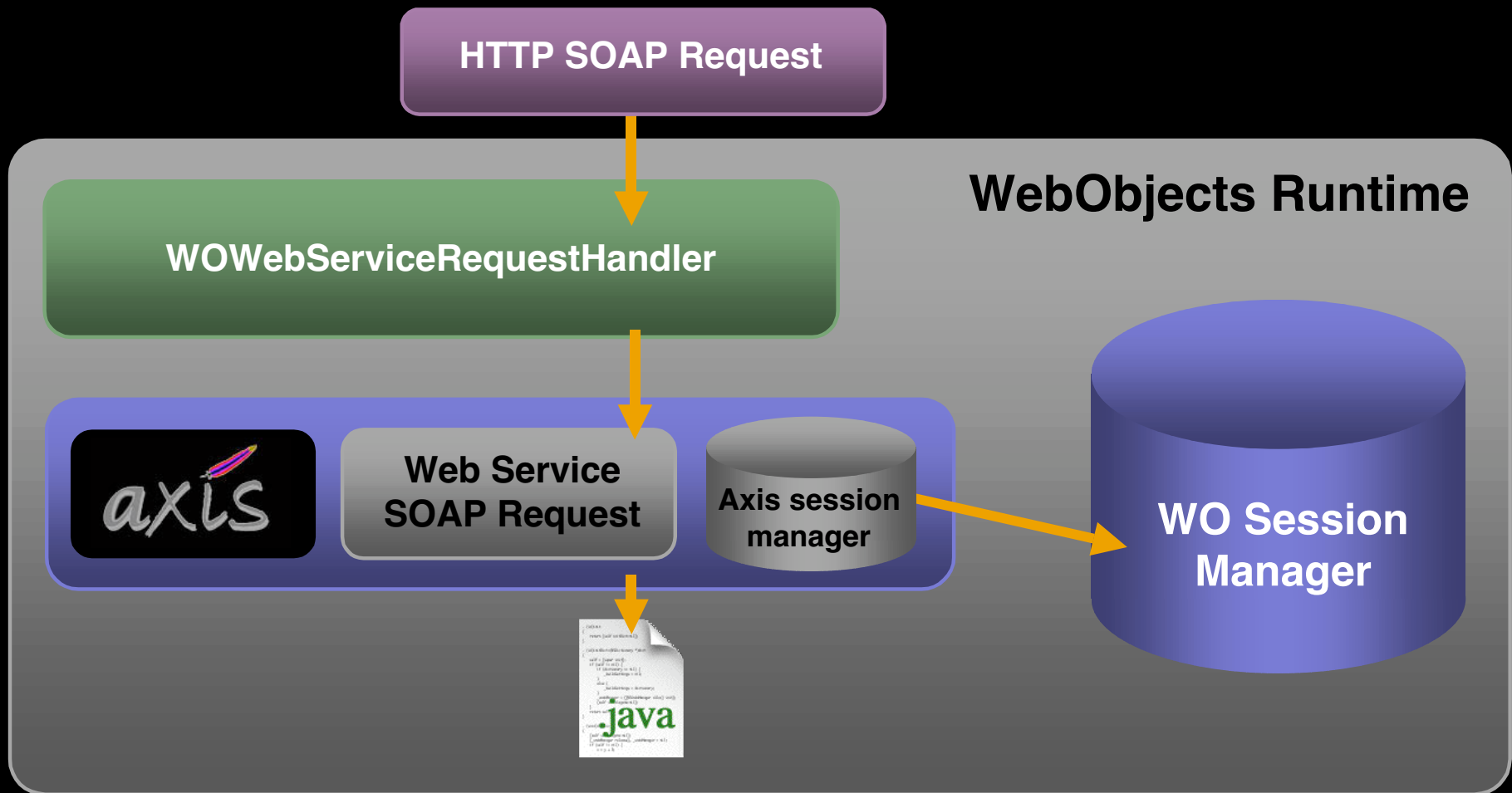
**Web Service HTTP  
SOAP Request**

**HTTP Server or J2EE Server**

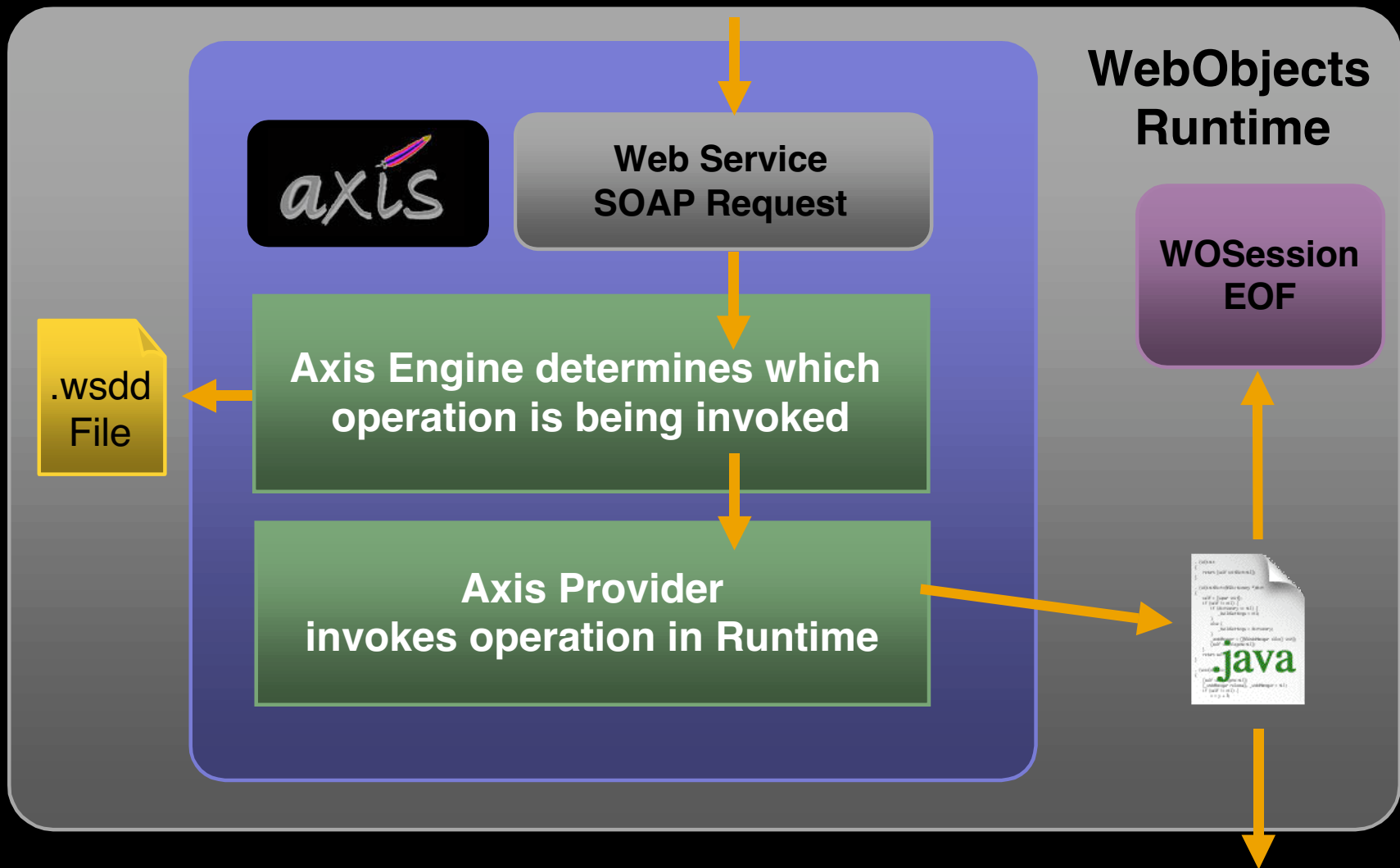
**WebObjects Application Server**



# What Happens on the Server Side?



# Inside the Server Side



# Returning a WOComponent

WebObjects  
Runtime



Type Registry

Axis Provider  
Builds SOAP Response



WOComponent Serializer

Web Service  
SOAP Response





# Returning an Object

WebObjects  
Runtime



Type Registry

Axis Provider  
Builds SOAP Response

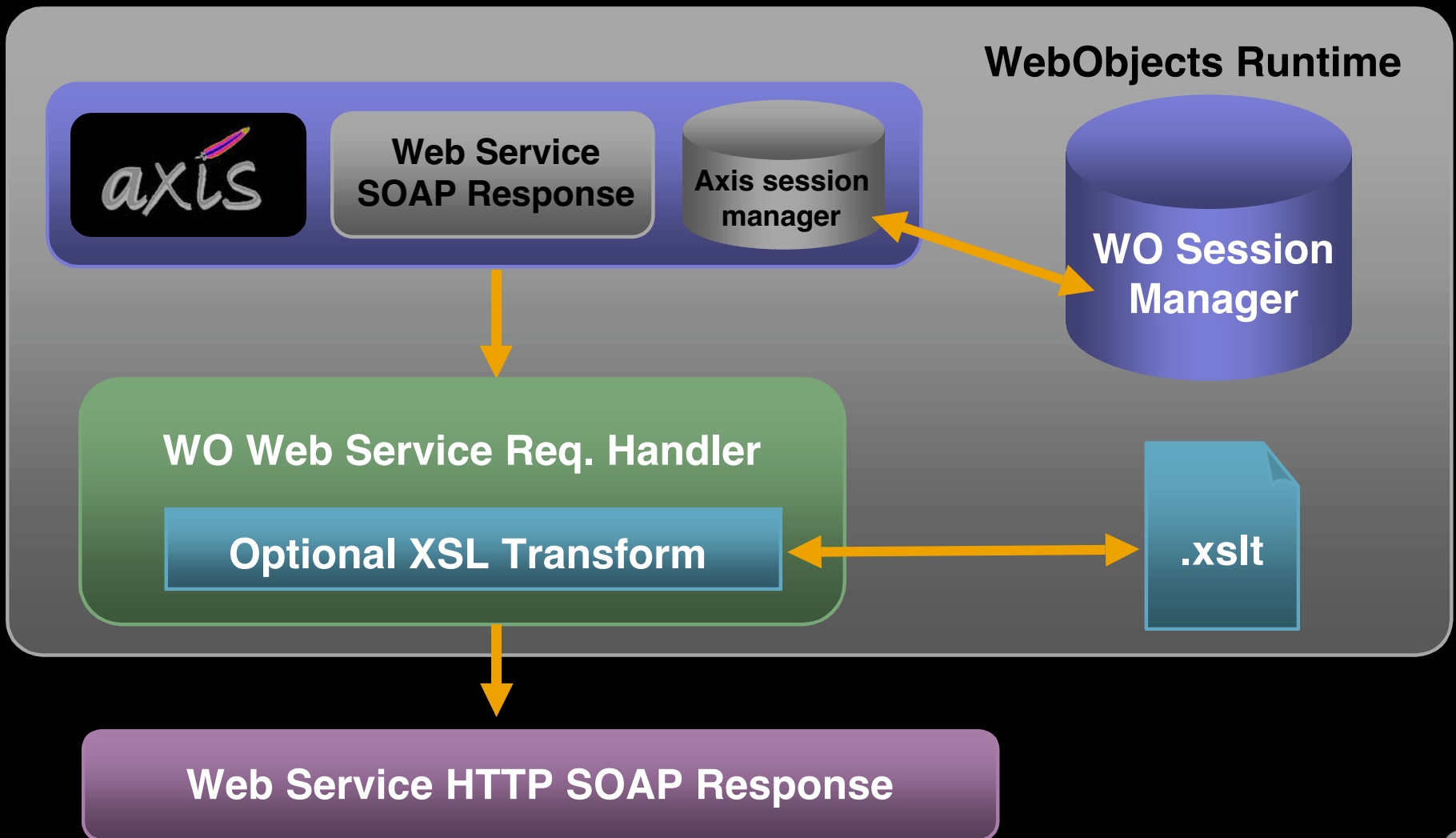


Serializer

Web Service  
SOAP Response



# End of Server Side



# WebObjects and Web Services

- RPC services: invoke any method, return any object

```
public class SayHello extends Object {  
    public String sayHello() {  
        return "Hello World!";  
    }  
}
```



# WebObjects and Web Services

- Document style services: you do the work

```
Import org.w3c.dom.Element;
```

```
public class DocService extends Object {  
    public Element sayHello(Element anElement) {  
        // do work here  
        return anElement;  
    }  
}
```



# Deploying Web Services

- standard .wsdd deployment
- dynamic deployment

```
public class Application extends WOApplication {  
    public Application() {  
        ...  
        WOWebServiceRegistrar.registerWebServiceForClass(SayHello.class);  
        ...  
    }  
}
```





# Direct to Web Services

**Ron Lue-Sang**  
**WebObjects Engineering**

# Direct to Web Services

- Why
- What
- How



# Why D2WS

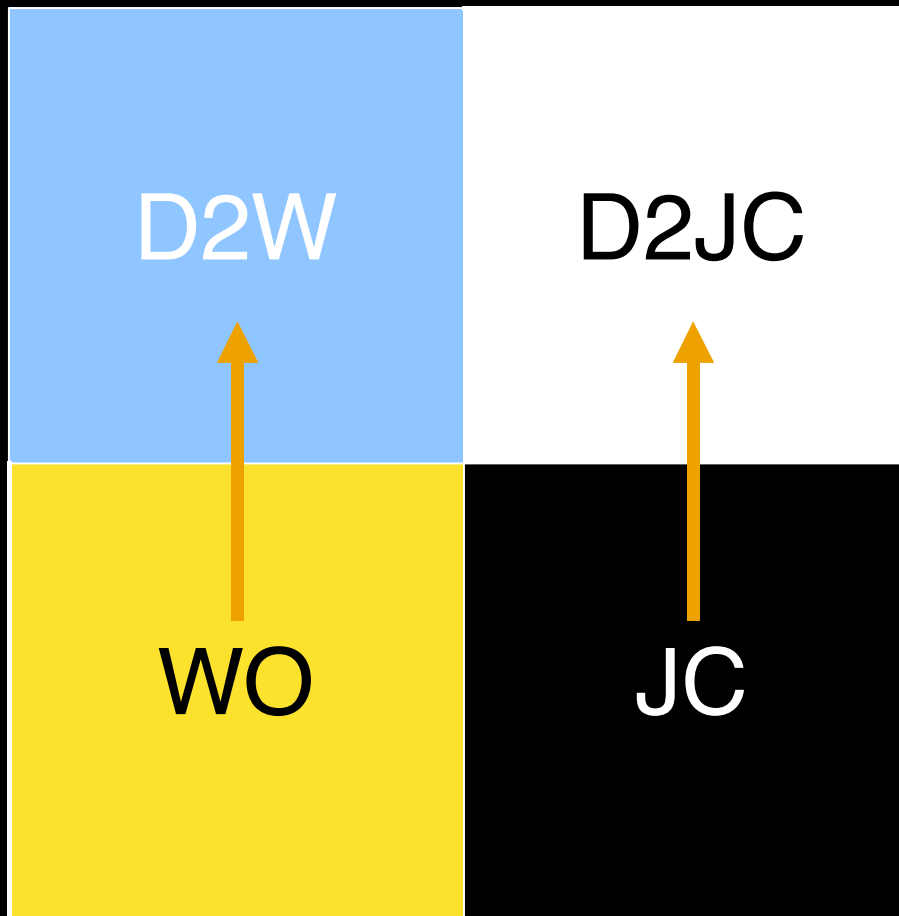
- Web services are cool
- EOF is cool
- Developers should write less code

Web services		
SOAP	WSDL	UDDI





# Why D2WS (Cont.)



# Why D2WS (Cont.)

- Target 80% of Web services operations
  - Search datasources
  - Purchase orders
  - Information update



# Why D2WS (Cont.)

- Lots of work + Little functionality = Web services
- Lots of functionality + Little work = D2WS
- 2 use cases
  - Existing Datasources
  - WebObjects Apps



# Why D2WS (Cont.)

- Existing Datasources → WebServices
  - Reverse engineer with EOModeler
  - Add your model and business logic
  - Add a couple frameworks
  - Start the app and run the assistant



# Why D2WS (Cont.)

- WO Apps → WebServices
  - Leverage model and business logic
  - Add a couple of frameworks
  - Start the app and run the assistant



# What Is D2WS

- Set of frameworks
  - JavaAXIS
  - JavaWebServicesGeneration
  - JavaDirectToWeb and JavaDTWGeneration
- Swing based Web Services Assistant
  - Configuration
  - Management
  - Testing



# What D2WS Offers

- WODefaultWebService
- Default Operations for CRUD
  - insert <Entity>
  - delete <Entity>
  - search <Entity>
  - update <Entity>
- Default WSDL for a service





# Demo

**Direct to Web Services**

**François Jouaux**  
**WebObjects Deployment Manager**



# Why D2WS (Cont.)

- Rule Based Programming
  - Jump-start development
  - Web services sync'ed with business logic!!



# How D2WS Works

- Ooooooh . . The Rule System
  - Same as D2W and D2JC
  - Inference engine
  - Rule files



isAudienceSleepy?

If (TimeOfDay == PM)  
then, 'YES'



# TimeOfDay? Assignment = MyAssignment timeOfDay?

```
public class MyAssignment extends com.webobjects.dirrectoweb.Assignment {  
    public String timeOfDay() {  
        return (date.afternoon()) ? 'PM' : 'AM'  
    }  
}
```

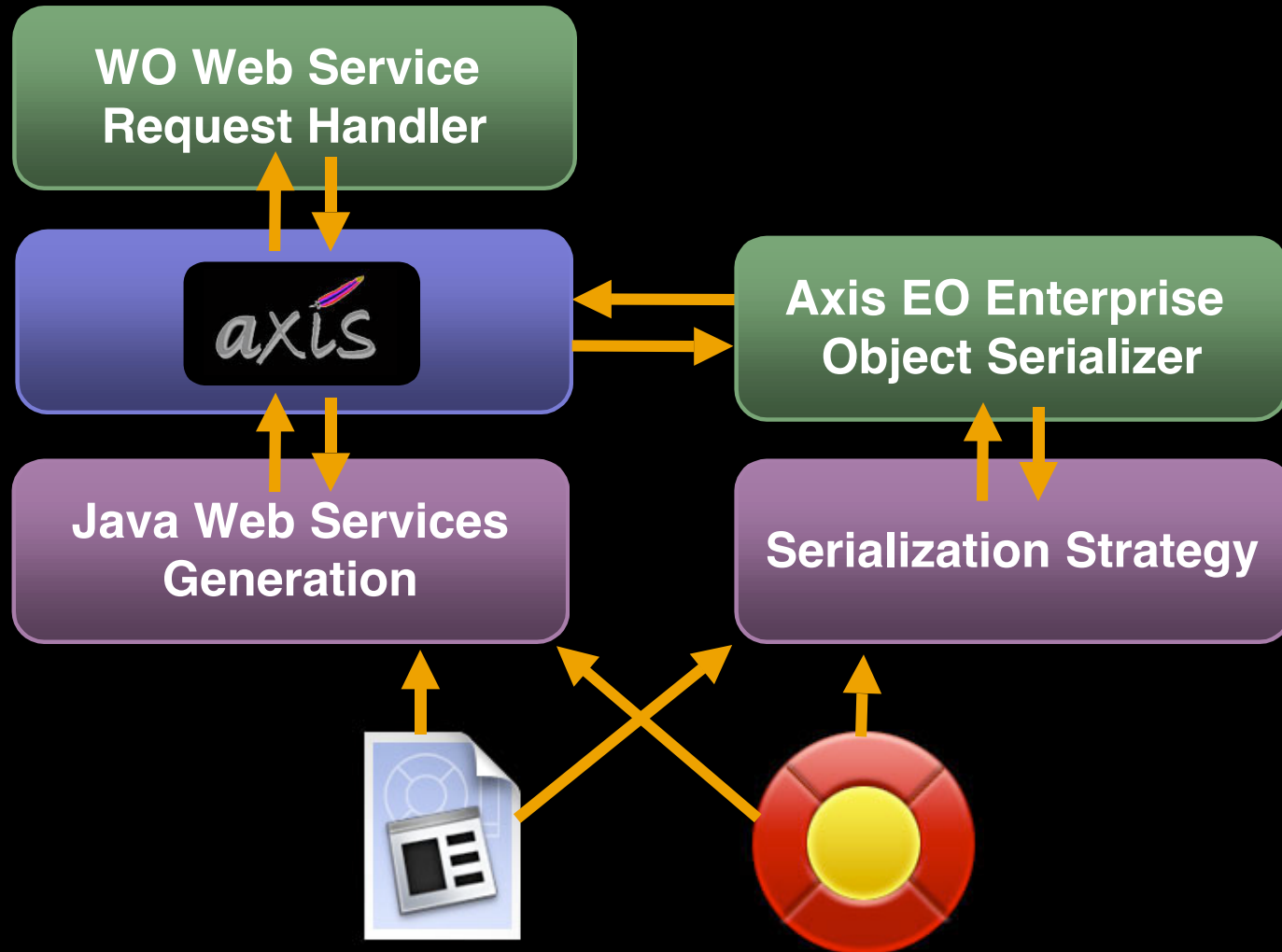


# How D2WS Works

- Heuristics in rules
  - Predefined default Rules
  - Assistant Customized Rules
- What happens
  - Code-free services!
  - Messages are routed through Axis and the Rules system
  - Performs Generic Search, Insert, Delete, Update operations



# Handling a Web Service Request



# How D2WS Works

- Usual D2\* Customization

<b>Easy</b>	<b>Advanced</b>	<b>More advanced than you may want to go</b>
<b>Assistant</b>	<b>RuleEditor</b>	<b>Code-Gen</b>



# More About Freezing Operations

- On a per operation basis, across Services
- WSDL portion is frozen as well
- Still Managed and Tested by the Assistant
- Can be ripped out and used standalone







# Demo

**Direct to Web Services**

**François Jouaux**  
**WebObjects Deployment Manager**

# Client Side

- We mostly use Axis for the client side
- We provide serializers for the most used WebObjects classes
- The client extracts the session information and sends it back in subsequent request when chaining transactions
- HTTPS is used on the client to connect securely to the Web services application



# Web Services and Security

- State of the art: HTTPS
- Industry work in progress
  - WS-Security
- We will track standards
  - WS-License
  - WS-Inspection



# Summary

- Create Web services by leveraging existing WebObjects applications
- D2WS makes vending Web services easy



# Resources

- <http://xml.apache.org/axis>
- <http://www.w3c.org/TR/wsdl>
- <http://www.w3c.org/TR/SOAP>
- <http://www.uddi.org>
- <http://www.webservices.org>
- <http://www.xmethods.org>



# WebObjects Lab

- Located downstairs in Room L
- Lab hours

Monday	12:00pm–6:00pm
Tuesday	9:00am–2:00pm
Wednesday	9:00am–6:00pm
Thursday	9:00am–6:00pm
Friday	9:00am–6:00pm



# Roadmap

---

**804 Client Web Services Frameworks**

Room J  
**Tues., 10:30am**

---

**406 Java Virtual Machine Internals**

Room C  
**Wed., 3:30pm**

---

**707 WebObjects Java Client**

Room A1  
**Wed., 5:00pm**

---

**FF013 WebObjects:**

Room A1  
**Fri., 3:30pm**



# Who to Contact

---

## **Toni Trujillo Vian**

Director, WebObjects Engineering

[webobjects@apple.com](mailto:webobjects@apple.com)

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## **Bob Fraser**

WebObjects Product Manager

[webobjects@apple.com](mailto:webobjects@apple.com)

---

## **Services Consulting, Integration, Training and Certification**

(800) 848-6398

[dilbert@apple.com](mailto:dilbert@apple.com)

---





# For More Information

- WebObjects Developer Documentation  
<http://developer.apple.com/techpubs/webobjects>
- Apple Professional Services Technical Support  
([www.apple.com/services/technicalsupport](http://www.apple.com/services/technicalsupport))
- Other places
  - [www.apple.com/webobjects](http://www.apple.com/webobjects)
  - [developer.apple.com/webobjects](http://developer.apple.com/webobjects)
  - [www.apple.com/services](http://www.apple.com/services)
  - [www.info.apple.com/webobjects](http://www.info.apple.com/webobjects)

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# Technical Documentation



- Developing Web Services (forthcoming)
- Data Serialization using XML (forthcoming)



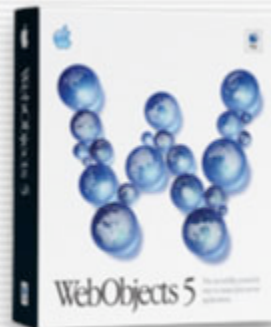
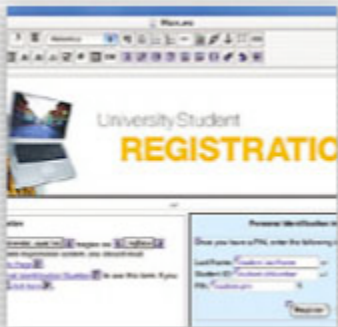
# How to Access Documentation

- Most up-to-date: PDF and HTML  
<http://developer.apple.com/techpubs/webobjects>
- Hardcopy print-on-demand  
Vervante.com under Related Resources
- Product CD  
Documents folder and installed in  
`/Developer/Documentation/WebObjects`
- In the box (localized)  
Installation Guides, What's New, WebObjects  
Overview, Java Client Desktop Applications,  
Discovering WebObjects for HTML
- Check ADC News for latest updates  
<http://developer.apple.com/devnews>





# Q&A



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<http://developer.apple.com/wwdc2002/urls.html>

 **WWDC2002**

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